This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : A47L 9/06 — A1

(11) International Publication Number: **WO 97/15224**

(43) International Publication Date: 1 May 1997 (01.05.97)

(21) International Application Number: PCT/SE96/01336

(22) International Filing Date: 18 October 1996 (18.10.96)

(30) Priority Data:
9503800-6 27 October 1995 (27.10.95) SE

(71) Applicant *(for all designated States except US)*: AKTIEBOLAGET ELECTROLUX [SE/SE]; Luxbacken 1, S-105 45 Stockholm (SE).

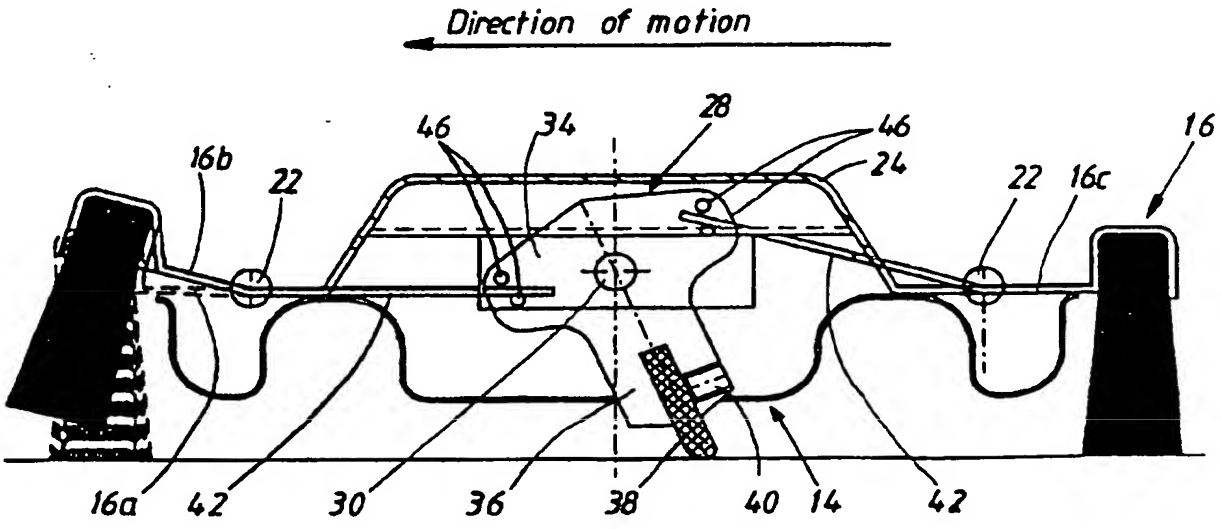
(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: MOREN, Lars [SE/SE]; Dalkantsvägen 20, S-141 41 Huddinge (SE). ARVIDSSON, Åke [SE/SE]; Sätunavägen 13 F, S-195 41 Märsta (SE).

(74) Agents: ERIXON, Bo et al.; AB Electrolux, Group Patents & Trademarks, S-105 45 Stockholm (SE).

(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: VACUUM CLEANER NOZZLE



(57) Abstract

The present invention relates to a vacuum cleaner nozzle (10; 10') adapted to contact a working surface, said vacuun cleaner nozzle including a brush nozzle (12; 12') having edge portions (16b, 16c; 16'b, 16'c) provided along the longitudinal sides of the brush nozzle (12; 12'). The invention also relates to a method to perform edge cleaning along the front edge portion, seen in the direction of motion, of the brush nozzle (12; 12'). Known vacuum cleaner nozzles have the disadvantage that when the brush nozzle is active dust and solid particles are transported around on the working surface that is vacuumed, i.e. dust and solid particles will not enter inside the brush rim. Further, known brush nozzles do not have edge cleaning along the front edge, seen in the direction of motion. Significant for the present invention is that the longitudinal edge portions (16b, 16c; 16'b, 16'c) are given a synchronized elevating/lowering movement whereby a front edge portion (16b; 16'b), seen in the direction of motion, is elevated from the working surface while simultaneously a rear edge portion (16c; 16'c), seen in the direction of motion, is lowered against the working surface.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	**GB**	United Kingdom	**MW**	Malawi
AT	Austria	**GE**	Georgia	**MX**	Mexico
AU	Australia	**GN**	Guinea	**NE**	Niger
BB	Barbados	**GR**	Greece	**NL**	Netherlands
BE	Belgium	**HU**	Hungary	**NO**	Norway
BF	Burkina Faso	**IE**	Ireland	**NZ**	New Zealand
BG	Bulgaria	**IT**	Italy	**PL**	Poland
BJ	Benin	**JP**	Japan	**PT**	Portugal
BR	Brazil	**KE**	Kenya	**RO**	Romania
BY	Belarus	**KG**	Kyrgystan	**RU**	Russian Federation
CA	Canada	**KP**	Democratic People's Republic of Korea	**SD**	Sudan
CF	Central African Republic			**SE**	Sweden
CG	Congo	**KR**	Republic of Korea	**SG**	Singapore
CH	Switzerland	**KZ**	Kazakhstan	**SI**	Slovenia
CI	Côte d'Ivoire	**LI**	Liechtenstein	**SK**	Slovakia
CM	Cameroon	**LK**	Sri Lanka	**SN**	Senegal
CN	China	**LR**	Liberia	**SZ**	Swaziland
CS	Czechoslovakia	**LT**	Lithuania	**TD**	Chad
CZ	Czech Republic	**LU**	Luxembourg	**TG**	Togo
DE	Germany	**LV**	Latvia	**TJ**	Tajikistan
DK	Denmark	**MC**	Monaco	**TT**	Trinidad and Tobago
EE	Estonia	**MD**	Republic of Moldova	**UA**	Ukraine
ES	Spain	**MG**	Madagascar	**UG**	Uganda
FI	Finland	**ML**	Mali	**US**	United States of America
FR	France	**MN**	Mongolia	**UZ**	Uzbekistan
GA	Gabon	**MR**	Mauritania	**VN**	Viet Nam

Vacuum cleaner nozzle

The present invention relates to a vacuum cleaner nozzle adapted to contact a working surface, said vacuum cleaner nozzle including a brush nozzle having edge portions provided in the area of the longitudinal sides of the brush nozzle.

In known vacuum cleaner nozzles of the type mentioned above the brush nozzle is normally provided with a circumferential brush rim. In operative position of the brush nozzle the brush rim contacts the working surface along its entire circumference. However, the brush rim might have certain interrupted portions to promote so called edge cleaning or facilitate for particles or the like to enter inside the brush rim. A tube shaft is normally connected to the vacuum cleaner nozzle via a tube connection that is pivotable relative to the vacuum cleaner nozzle to allow the tube shaft to be angled, within certain limits, relative to the vacuum cleaner nozzle and thus not affecting the contact of the brush rim against the working surface. This means that during normal handling of the tube shaft in connection with vacuum cleaning and the brush rim being in active position, the entire circumference of the brush rim will contact the working surface. It is realized that as a consequence of this contact along the entire circumference the brush rim will to a great extent only shove around particles that are present on the working surface, i.e. said particles will not enter inside the brush rim due to the contact of the rim against the working surface along its entire circumference. Certainly the above-mentioned interrupted portions of the brush rim in certain areas might bring about that particles to a small extent will enter inside the brush rim. However, this will not at all occur to a sufficient degree. So called edge cleaning along the longitudinal front edge of the brush nozzle is as well not possible in connection with known vacuum cleaner nozzles of the type described above. The aim of the present invention is to present a vacuum cleaner nozzle of the above-mentioned type where it is guaranteed that particles to be

sucked enter inside the brush rim when the brush nozzle is in active position. A vacuum cleaner nozzle according to the present invention also makes so called edge cleaning possible.

The aim of the present invention is realized by a vacuum cleaner nozzle that has been given the characteristics of the appending claims. Below an embodiment of the invention will be described, reference being made to the accompanying drawings, where Fig.1a discloses a top view from beneath of the vacuum cleaner nozzle according to the invention when said nozzle is displaced in the given direction of motion, the gliding plate being removed to increase the clarity; Fig.1b shows a section along Ib-Ib in Fig.1a; Fig.2a shows a top view from beneath of the vacuum cleaner nozzle according to the invention when said nozzle is displaced in the given direction of motion, the gliding plate being removed to increase the clarity; Fig.2b shows a section along IIb-IIb in Fig.2a; Fig.a and 3b show schematic side views of an alternative embodiment of the invention; and Fig.4 shows a top view from beneath of the embodiment according to Fig.3a and 3b, the gliding plate being removed to increase the clarity.

As can be seen from the figures the vacuum cleaner nozzle 10 according to the present invention includes a brush nozzle 12 and a flat nozzle 14, said nozzle 10 being adjustable in such a way that either the brush nozzle 12 contacts the working surface, via a brush rim 16, or the flat nozzle 14 contacts the working surface, via a gliding plate 18. The adjustment of the nozzle 10 is either effected manually or automatically, e.g. by registering the vacuum at the working surface.

It is also possible to design the vacuum cleaner nozzle in such a way that the brush rim 16 of the brush nozzle 12 is capable to assume several fixed vertical positions and even that the brush rim 16 is continously displacable vertically. Also in these cases the adjustment may be effected manually or automatically. Other arrangements of the adjustment of the

brush nozzle/flat nozzle are possible within the scope of the invention. Thus the above given examples are not to be interpreted in a restricting sense.

Figs.1a, 1b, 2a, 2b all show the position of the vacuum cleaner nozzle 10 where the brush nozzle 12 contacts the working surface. The flat nozzle 14, i.e. the gliding plate 18, assumes a position at a distance from the working surface.

Significant for the embodiment shown in Figs.1a, 1b, 2a, 2b is that the brush rim 16 includes two stationary end portions 16a and two intermediate longitudinal edge portions 16b and 16c, said portions being movable relative to the stationary end portions 16a. Within the scope of the invention the movable edge portions 16b and 16c can have a length that constitutes a varying part of the width of the nozzle, i.e. it is e.g. in principe possible that the movable edge portions 16a, 16c extend along the entire longitudinal sides of the nozzle.

As most clearly is shown in Figs.1a and 2a the stationary end portions of the brush rim 16 are provided with edge cleaning openings 20 that are created by removing a portion of the brush rim 16. In this connection it should be pointed out that the edge cleaning openings 20 not at all is a prerequisite for the present invention. It should also be clarified that the stationary end portions 16a and the movable edge portions 16b and 16c as a unit can be displaced relative to the flat nozzle 14 in connection with the adjustment of the nozzle 10 described above.

Via hinges 22 the movable edge portions 16b and 16c of the brush rim 16 are attached to a support plate 24 that is provided with an opening 26 straight in front of the suction opening in the casing (not shown in the figures) of the vacuum cleaner nozzle 10. To achieve and syncronize the movement of the movable edge portions 16b and 16c relative to the stationary end portions 16a of the brush rim 16 according to

the shown embodiment two sliding shoes 28 are provided, said shoes 28 being pivotable relative to separate shanks 30, that are attached to the support plate 24 via separate support means 32.

The sliding shoes 28 have an upper attachment portion 34 that receives the shank 30, and further a downwardly extending control element 36 that receives an exchangeable tongue 38 of a resilient material, said tongue 38 being adapted to contact the working surface. The tongue 38 is fixed in the control element 36 via a locking screw 40.

To each movable edge portion 16b and 16c of the brush rim 16 two sheet metal pieces 42 are attached, said metal pieces being located right in front of the adherent sliding shoe 28. Said sheet metal pieces 42 are preferably designed as integral parts of the movable edge portions 16a, 16c. The ends of the sheet metal pieces 42 that face the sliding shoe 28 have a recess creating two fingers 44 of each sheet metal piece 42, said fingers 44 on both sides surrounding the attachment portion 34 of the sliding shoes 28.

As most evident is shown in Figs.1b and 2b the attachment portion 34 of the sliding shoes 28 are on both sides provided with through-going pins 46 arranged in pairs. Each pair of pins 46 receive between themselves the fingers 44 of a sheet metal piece 42. By studying Figs.1b and 2b it is learnt that the sliding shoes 28 assume a predetermined end position depending on the direction of motion disclosed in the figures, i.e. due to the friction cooperation between the tongue 38 and the working surface the sliding shoes 28 move between their end positions. When the sliding shoes 28 assume the position shown in Fig.1a the movable portion 16b of the brush rim 16 that is located in front in the direction of motion is elevated somewhat from the working surface. This is effected by a pivotal movement downwards of the fingers 44 of the adherent sheet metal piece 42, said pivotal movement of the fingers 44

being carried out by the adherent pair of pins 46. The movable edge portion 16b of the brush rim 16 will then pivot around its adherent hinge 22 and somewhat elevate from the working surface.

It is at once clear from Fig.1b that the elevation of the movable front edge portion 16b of the brush rim 16 brings about that solid particles, dust and the like of the working surface enter inside the brush rim 16 and is sucked in through the suction opening 26. Thus the disadvantages discussed in the preamble of the description, i.e. that solid particles and dust to a too large extent only are shoved around by the brush rim, have been eliminated.

As regards the movable edge portion 16c located behind in the direction of motion according to Fig.1b, said portion 16c is brought into contact with the working surface. This is achieved by displacement upwardly, via the pair of pins 46, of the fingers 44 of the adherent sheet metal piece 42. Then the movable edge portion 16c of the brush rim 16 is pivoted downwardly to contact the working surface. By this arrangement it is prevented that the solid particles, dust and the like that enter inside the brush rim 16 by elevation of the movable edge portion 16b, pass through the brush rim 16 without being sucked in through the opening 26. The activation upon the edge portions 16b and 16c from the sliding shoes 28, said activation being carried out via the pair of pins 46 and the sheet metal pieces 42, brings about a syncronized tilting movement, i.e. in the direction of motion shown in Fig.1a and 1b the edge portion 16b is elevated from the working surface simultaneously as the edge portion 16c is urged against the working surface.

As is indicated in Fig.1b the stationary end portion 16a of the brush rim 16 permanently contacts the working surface when the brush rim 16 is in active position. Thereby support at the ends of the vacuum cleaner nozzle is achieved when the edge portions 16b and 16 c perform their syncronized tilting movement.

In Fig.2b the syncronized tilting movement of a vacuum cleaner nozzle according to the invention is shown, the direction of motion for the vacuum cleaner nozzle being the one shown in Figs.2a and 2b. Due to the friction between the tongues 38 and the working surface the sliding shoes 28 have adjusted to the position shown in Fig.2b. The edge portion 16c will be elevated while the edge portion 16b will be brought into contact with the working surface. Apart from the fact that a reversal of the edge portions has taken place the syncronized tilting movement is completely analogue to the one described above in connection with Fig.1c. Reference is therefore made to what has been said above in that respect.

By the vacuum cleaner nozzle 10 according to the present invention it is achieved that, independent of the direction of motion of the nozzle, a front edge portion, seen in the direction of motion, of the brush rim will be elevated from the working surface while a rear edge portion, seen in the direction of motion, is urged against the working surface.

By studying Fig.1b it is realized that when the vaccum cleaner nozzle is displaced forwardly to contact e.g. a floor skirting so called edge cleaning of solid particles, dust and the like close to the floor skirting will take place. This has not been possible with known vacuum cleaner nozzles.

Within the scope of the invention several variants of a vacuum cleaner nozzle are possible. Thus it is not necessary that the nozzle is a so called combination nozzle, i.e. a brush nozzle and a flat nozzle. Since the invention refers to a structural design of the brush nozzle it is only necessary that the vacuum cleaner nozzle according to the present invention includes a brush nozzle.

According to the embodiment described above the intermediate portions of the brush rim are movable while the end portions of the brush rim of the vacuum cleaner nozzle are stationary.

However, within the scope of the invention it is also possible that the entire brush rim tilts as a unit in such a way that its front and rear edges repectively are given said syncronized tilting movement according to the invention.

In Figs.3a, 3b and 4 an embodiment of the invention is shown where the brush rim 16′ as a unit performs a syncronized tilting movement. As can be learnt from Figs.3a and 3b a holder means 50′ is attached to the schematically shown flat nozzle 14′, that in the position according to Fig.3a and 3b is elevated from the ground. Via its center of rotation, a bearing wheel 52′ is rotatably supported by the holder means 50′ and contacts the ground. A flexible, friction increasing element 54′, e.g. an O-ring may be mounted along the periphery of the bearing wheel 52′. Via e.g. teeth the bearing wheel meshes with a switch wheel 56′ that, via its centre of rotation 57′, is rotatably supported by the holder means 50′. Via a yoke 58′ the brush rim 16′ is carried by the switch wheel 56′, said yoke 58′ being fixed to the switch wheel 56′ in such a way that when the switch wheel 56′ rotates around its centre of rotation 57′ the yoke 58′ and the brush rim 16′ are also rotationally driven, i.e. also the brush rim 16′ rotates around the centre of rotation 57′. The nozzle 10′ is also provided with a slipping device (not shown) that enters into operation when the brush rim 16′ has reached one of the two end positions of the tilting movement.

As is obvious from Fig.4 the nozzle 10′ is also provided with sliding bars 60′ or the like that in principle have the same function as the stationary end portions 16a of the brush rim according to the previous described embodiment, i.e. the sliding bars 60′ permanently rest against the ground when the brush rim 16′ performs its tilting movement.

In Figs.3a and 3b the tilting movement of the brush rim 16′ is illustrated for different directions of moition. In the direction of motion according to Fig.3a the bearing wheel moves in direction of the arrow 62′ and consequently the switch wheel

56' moves in direction of the arrow 64'. This results in the tilting of the brush rim 16' as disclosed in Fig.3a. A tilting in reverse direction takes place for a direction of motion according to Fig.3b.

As regards the embodiments of the present invention described above the syncronized movement of the brush rim is controlled by the aid of means that cooperate with the working surface. However, these means may be designed differently and besides the sliding shoes and bearing wheels shown in the disclosed embodiments other types of means are possible, said means contacting the working surface in active position of the brush nozzle and being in a convenient way connected to the movable parts of the brush rim in order to achieve the required tilting movement. Within the scope of the invention it is possible that the tilting movement of the brush rim is controlled by means that **not** physically cooperate with the working surface, i.e. some kind of non-touching sensing means that register the direction of motion of the nozzle. More specifically such means could consist of a mechanical or electronical acceleration sensor that registers the direction of motion of the nozzle. Said acceleration sensor activates e.g. a micro motor or an electromagnet that provides a syncronized tilting movement, i.e. the front edge portion, seen in the direction of motion, is elevated from the ground while the rear edge portion, seen in the direction of motion, is lowered against the ground.

The nozzle according to the embodiments described above includes a closed, substantially circumferential brush rim. However, the brush rim can have openings for edge cleaning. Such a closed brush rim includes longitudinal edge portions along the two longitudinal sides of the nozzle. Within the scope of the invention it is possible that the nozzle instead of a closed brush rim includes two separate, parallel edge portions along the longitudinal sides of the nozzle. Said edge portions perform a syncronized elevating/lowering movement, the front edge portion, seen in the direction of motion, is

elevated while the rear edge portion, seen in the direction of motion, is lowered.

So called brush nozzles for vacuum cleaners often have bristle means that contact the ground. However, there are nozzles where the bristle is replaced by scrapers/slicers of flexible material, e.g. plastic. The present invention relates also to these types of nozzles. Therefore the expression "edge portion", used in the claims, should be interpreted as also including scrapers/slicers of flexible material.

Claims

1. Vacuum cleaner nozzle (10;10') adapted to contact a working surface, said vacuum cleaner nozzle including a brush nozzle (12;12') having edge portions (16b,16c;16'b,16'c) provided along the longitudinal sides of the brush nozzle (12;12'), **characterized in that** the nozzle (10;10') includes means (22,28,42;52') that, in active position of the brush nozzle, elevate the front edge portion (16b;16'b), seen in the direction of motion of the nozzle (10;10'), from the working surface simultaneously as the rear edge portion 16c;16'c), seen in the direction of motion of the nozzle (10;10'), is lowered to contact said working surface.

2. Vacuum cleaner nozzle (10;10') according to claim 1, **characterized in that** the brush nozzle (12;12') includes support means (16a;60') in the area of the ends of the vacuum cleaner nozzle (10;10').

3. Vacuum cleaner nozzle (10;10') according to claim 1 or 2, **characterized in that** the movable edge portions (16c;16'c) form parts of a brush rim (16;16') that is given a syncronized tilting movement.

4. Vacuum cleaner nozzle (10;10') according to claim 3, **characterized in that** the support means consist of stationary end portions (16a) of the brush rim (16), and that the movable edge portions (16b) of the brush rim (16) are located between the stationary end portions (16a) along the two longitudinal sides of the brush rim (16).

5. Vacuum cleaner nozzle (10;10') according to any of the previous claims, **characterized in that** the means for performing the syncronized elevating/lowering movement include at least one pivotally suspended sliding shoe (28) that is adjustable in dependence of the direction of motion, said sliding shoe (28) contacting the

working surface via a tongue (38) of flexible material.

6. Vacuum cleaner nozzle (10;10') according to any of the previous claims,
characterized in that the movable edge portions (16b,16c) are pivotally attached, via hinges (22), to a supporting part (24) of the nozzle.

7. Vacuum cleaner nozzle (10;10') according to claim 5,
characterized in that the sliding shoe (28) is connected to the movable edge portions (16b,16c) via lever means (42).

8. Vacuum cleaner nozzle (10;10') according to claim 7,
characterized in that the lever means consist of sheet metal pieces (42) having fingers (44) at their ends facing away from the movable edge portions (16b,16c), said fingers (449 cooperating with pairs of pins (46) of the sliding shoes (28).

9. Vacuum cleaner nozzle (10;10') according to claim 5,
characterized in that the tongues (38) of the sliding shoes (28) are exchangeable.

10. Vacuum cleaner nozzle (10;10') according to any of the previous claims, said nozzle also including a flat nozzle (14), the brush nozzle (12) and the flat nozzle (14) alternately being in contact with the working surface of the nozzle,
characterized in that in active position of the brush nozzle (12) the means (28) for giving the movable edge portions (16b,16c) a syncronized tilting movement extend through an opening in the flat nozzle (14).

11. Vacuum cleaner nozzle (10;10') according to claim 3,
characterized in that the brush rim (16') as a unit performs the syncronized tilting movement.

12. Method to perform edge cleaning along the front edge, seen in the direction of motion, of a brush nozzle (12;12) of a

nozzle (10;10') that contacts a working surface, said brush nozzle (12;12') having edge portions (16b,16c;16'b,16'c) along the longitudinal sides of the brush nozzle (12;12'), **characterized in that** the front and rear edge portions (16b and 16c respectively;16'b and 16'c respectively), seen in the direction of motion, alternately are elevated from or lowered to the working surface in an internally syncronized tilting movement.

Fig. 2a

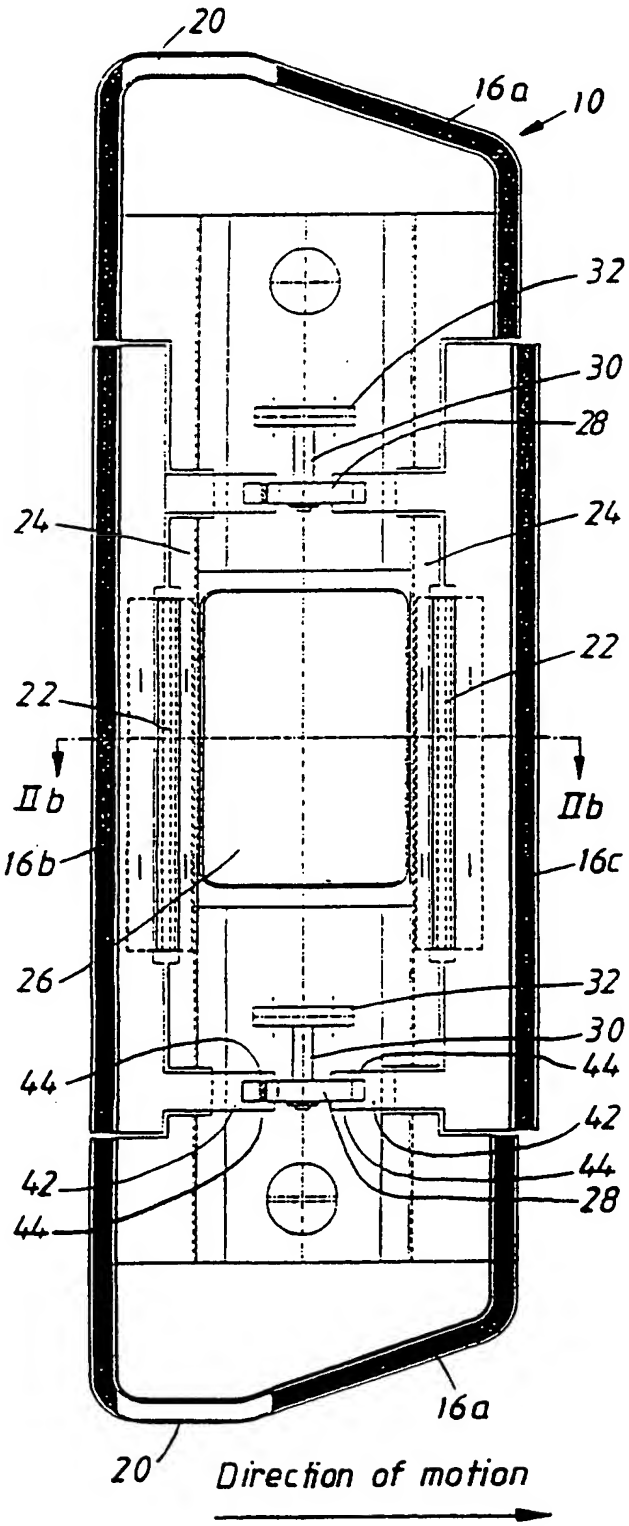
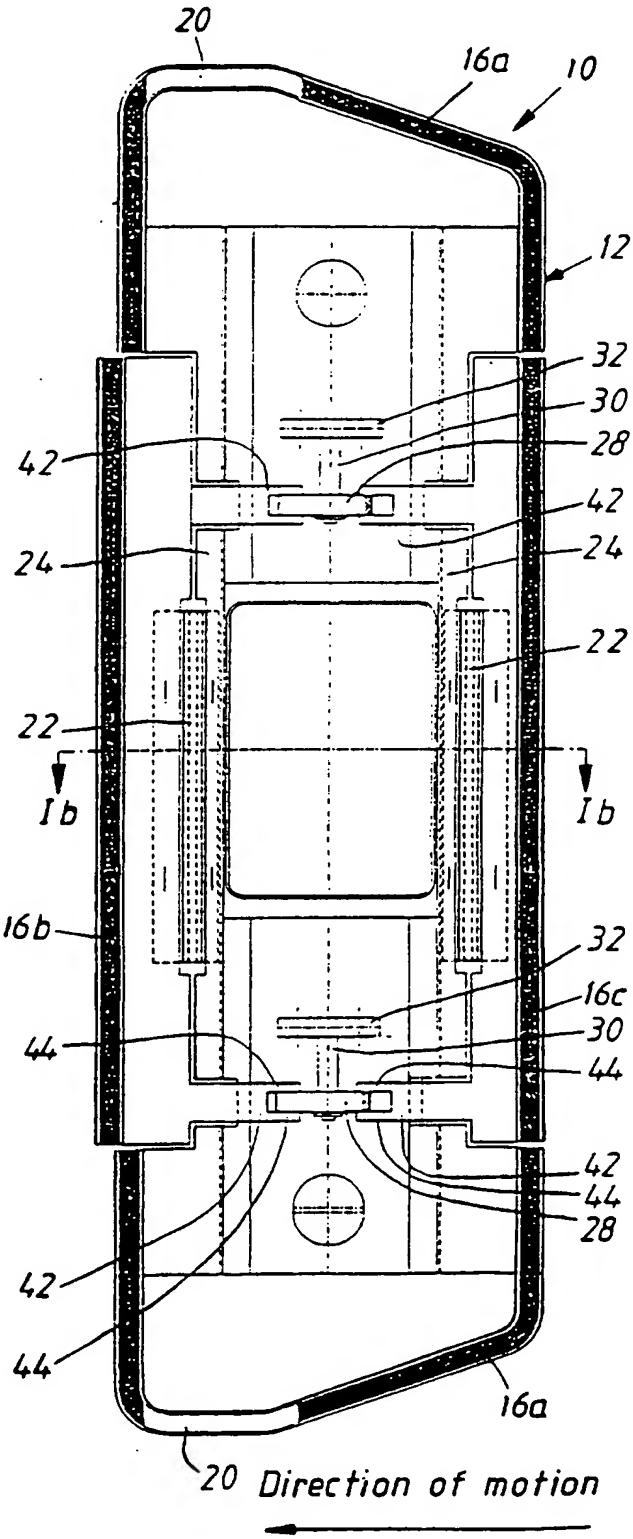

20
16a
10
32
30
28
24
24
22
22
IIb
IIb
16b
16c
26
32
30
44
44
42
42
44
28
16a
20
Direction of motion

Fig. 1a


20
16a
10
12
32
30
28
42
42
24
24
22
22
Ib
Ib
16b
32
16c
30
44
44
42
44
28
42
44
16a
20
Direction of motion

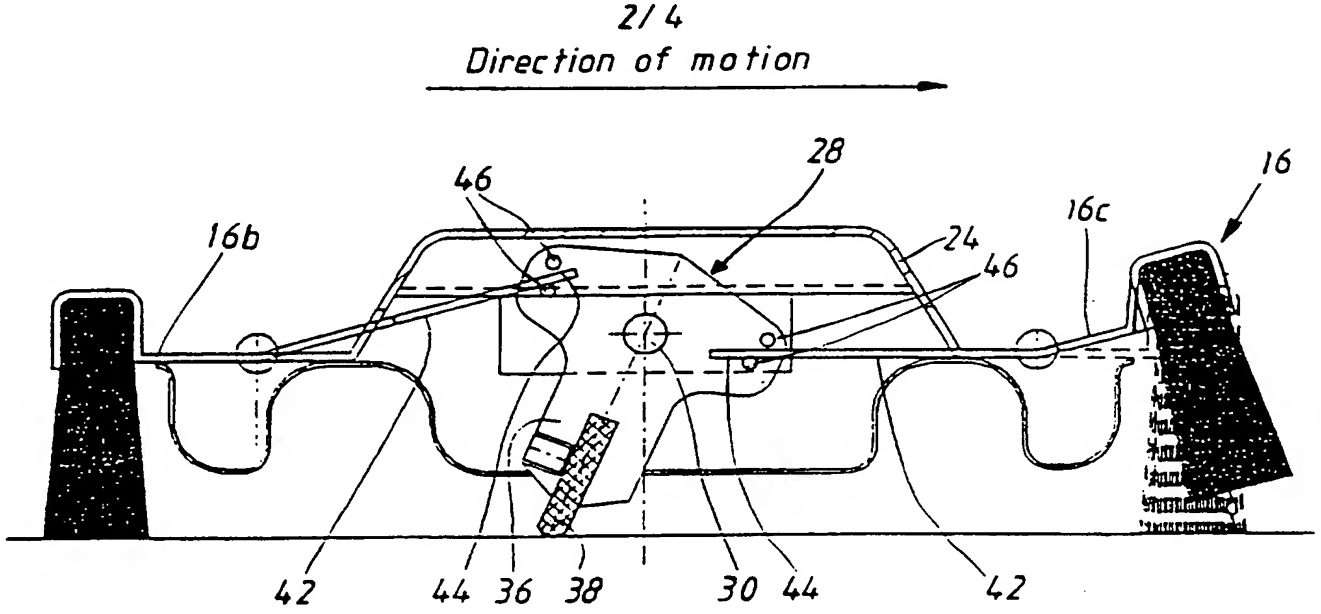

Direction of motion
28
46
16
16b
16c
24
46
42
44
36
38
30
44
42

Fig. 2b

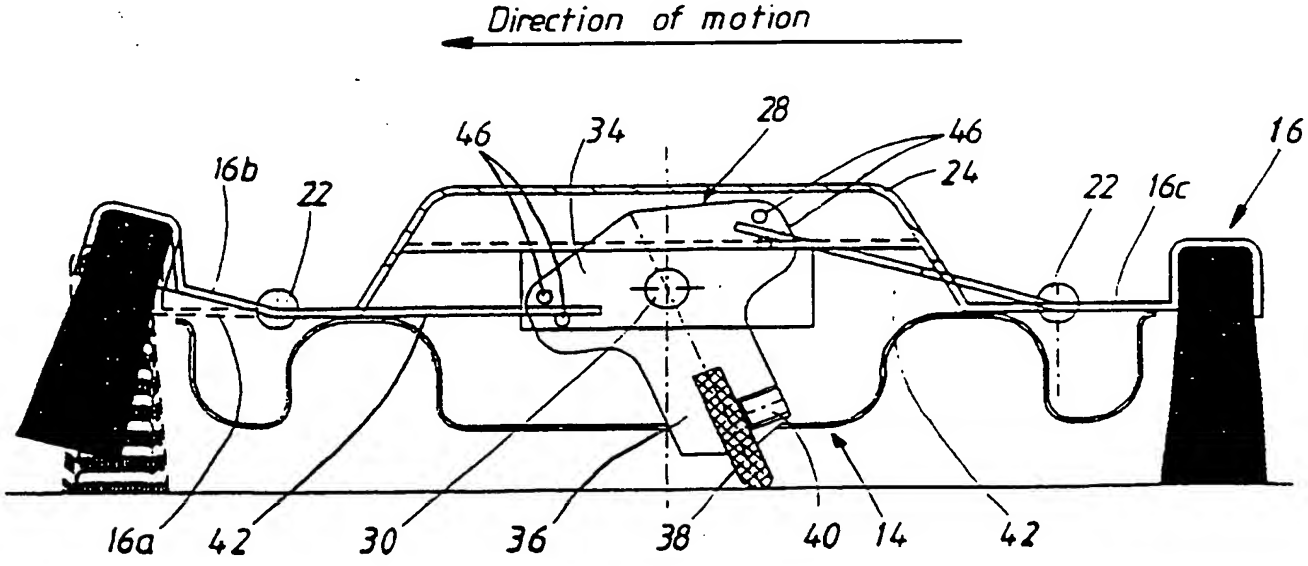

Direction of motion
46
34
28
46
16
16b
22
24
22
16c
16a
42
30
36
38
40
14
42

Fig. 1b

Fig. 3a

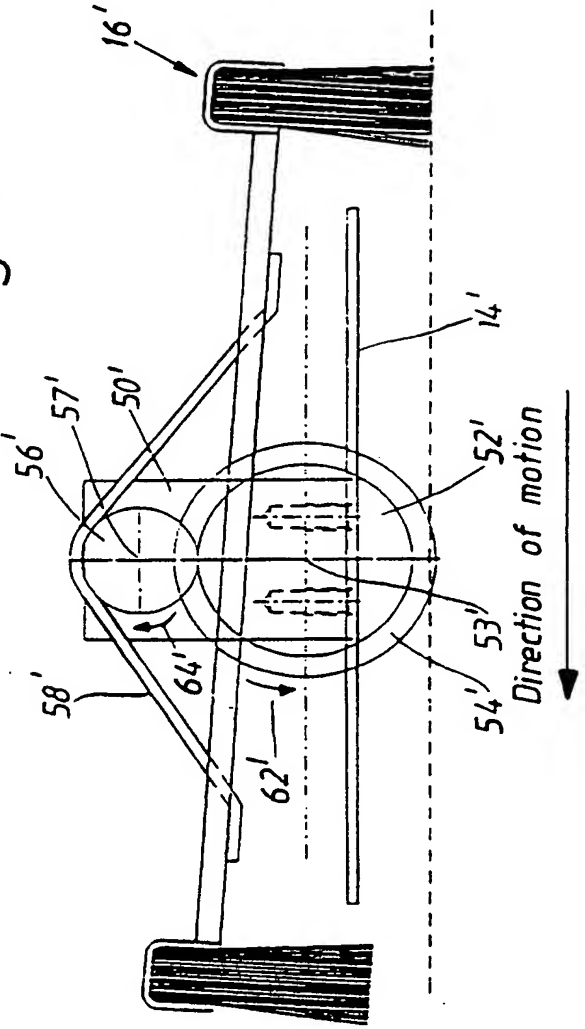
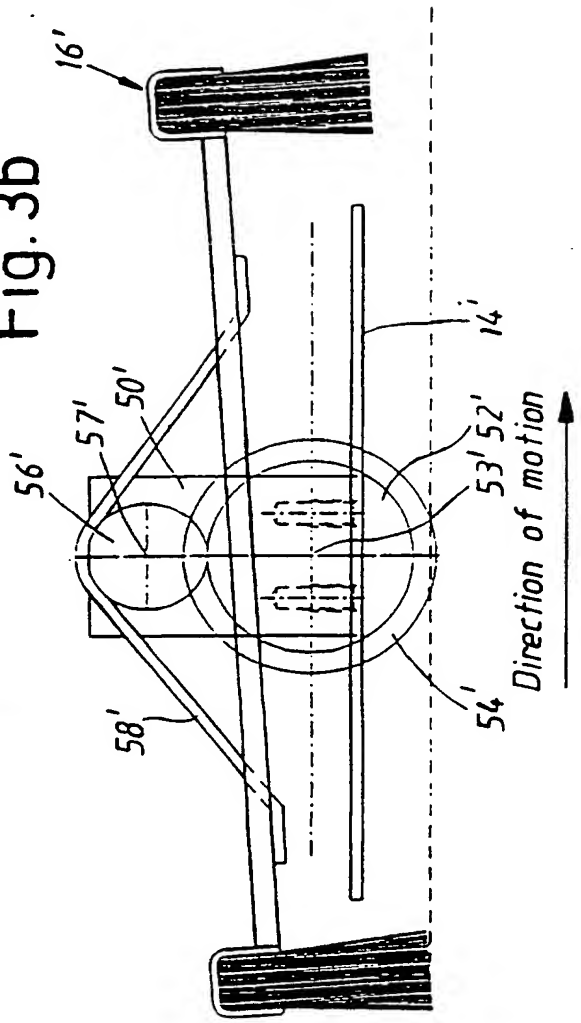

16'
14'
50'
57'
56'
52'
53'
54'
58'
64'
62'
Direction of motion

Fig. 3b


16'
14'
50'
57'
56'
53'
52'
54'
58'
Direction of motion

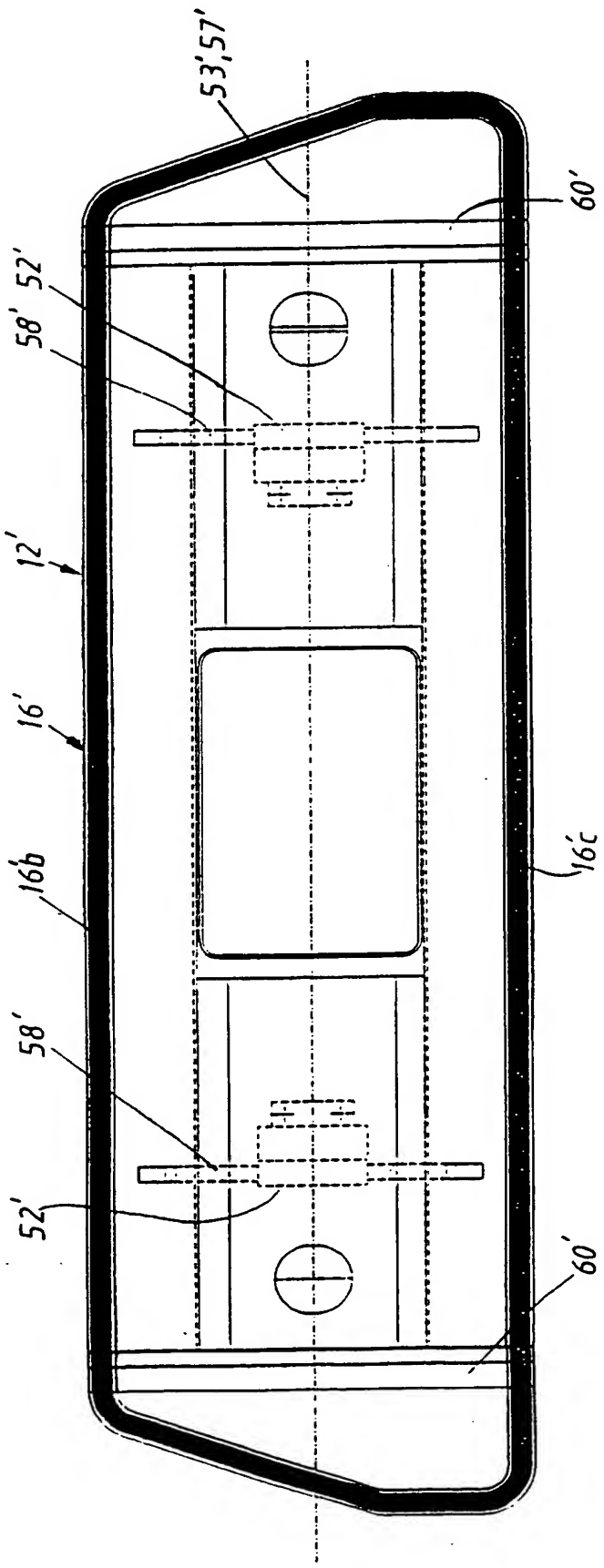


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 96/01336

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: A47L 9/06
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: A47L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2047677 A (E. EDSTRÖM), 14 July 1936 (14.07.36), figure 5, details 14,15	1,12
Y	--	2-4,11
Y	FR 2442617 A1 (ETABLISSEMENTS GEORGES OLIVER), 27 June 1980 (27.06.80), figures 4,5	2-4,11
	--	
A	SE 334716 B (AB ELECTROLUX), 3 May 1971 (03.05.71), figures 1-3	1-11
	--	
A	US 2948014 A (O.L. ALLEM), 9 August 1960 (09.08.60), figure 14	1-11
	--	

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 January 1997	03 -02- 1997
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Jan-Axel Ylivainio Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 96/01336

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2216275 A (H.A. KROENLEIN), 1 October 1940 (01.10.40), figure 3 ---	12
A	DE 1038728 B (SIEMENS-ELECTROGERÄTE AKTIENGESELLSCHAFT), 11 Sept 1958 (11.09.58), figures 1,2 -- --------	12

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/10/96

International application No.
PCT/SE 96/01336

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 2047677	14/07/36	NONE	
FR-A1- 2442617	27/06/80	NONE	
SE-B- 334716	03/05/71	DE-A- 2003180	03/09/70
		FR-A,B- 2030332	13/11/70
		GB-A- 1289468	20/09/72
		NL-A- 7001640	10/08/70
		US-A- 3660864	09/05/72
US-A- 2948014	09/08/60	NONE	
US-A- 2216275	01/10/40	NONE	
DE-B- 1038728	11/09/58	NONE	